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Risk Insurance I became conscious of the fact that while the responsibility of conducting the affairs of the bureau rested upon the director, subject, of course, to the general supervision of the Secretary of the Treasury, that the work of the bureau was no one man's job, that the full counsel and cooperation should be secured of all who were equally interested and concerned in order to make the bureau's work most effective and so that the provisions of the War Risk Insurance Act could serve effectively all those whom Congress intended should be benefited thereby.

The influence and cooperation of you, gentlemen, whose sphere is unlimited, is not only desirable, but is essential to the proper carrying out of the government's program in meeting adequately the needs of ex-service men and women.

PRESENT NEEDS OF THE UNITED STATES PATENT OFFICE

By ROBERT F. WHITEHEAD

COMMISSIONER OF PATENTS

UNDER Article 1 of Section 8 of the Constitution, Congress was granted power to promote the progress of Science and Useful Arts by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries.

Under this power Congress has passed laws authorizing the issuance to any one who has made a new and useful invention in an art, machine, manufacture, or composition of matter, of a patent for a term of seventeen years, granting to the patentee the exclusive right to make, use and sell his invention or discovery.

To the Patent Office, Congress has given the duty of examining all applications for patent and determining whether the applicant is justly entitled to the patent which he seeks.

While many people are more or less familiar with patents, few realize to what extent all classes of citizens are affected by the work of the inventor who is largely stimulated to do his work by the hope of a reward from the granting of a patent.

The Patent Office deals with all the efforts of the world in every field of industry to advance the useful arts. In his report for 1916 the Commissioner of Patents, as illustrating the various interests both public and private which are involved and the extent of such interest, said:

> What great interests are involved, not merely of private but of public concern, may be illustrated by a few examples relating to the field of conservation of fuel.
>
> The Commonwealth Edison Company of Chicago reports that it has

effected a reduction in coal consumption from nearly seven pounds per kilowatt-hour to 2.7 pounds per kilowatt-hour within the last 10 years. With this and other economies the cost to the consumer per kilowatt-hour was reduced in 1915 to one-sixth the cost of 1905, and the company in 1912, with a consumption of 1,103,230 tons of coal, produced an amount of electricity which on the basis of the apparatus of 1902 would have required the consumption of 2,650,000 tons.

The Seventy-fourth Street Station of the Interborough Rapid Transit Company of New York City has recently introduced improvements which, it is reported, have caused a drop of coal consumption from 2½ pounds per kilowatt-hour to 1½ pounds per kilowatt-hour.

It is estimated that the new steam plant of the Buffalo General Electric Company at Tonawanda, N. Y., will generate electricity from coal more cheaply than can be done from the waters of Niagara Falls.

The great economies are due, in large measure, to the modern automatic stoker and regulator, to furnace construction, to forced draft, to coal-handling machinery, and other inventions.

What has gone on in this particular field has been going on in almost all of the fields of industry known in 1890 and in many which have been discovered since that date.

New arts have been discovered such as wireless telegraphy, telephony, and control of torpedoes, searchlights and gun pointing, vacuum cleaning, X-ray apparatus, liquefaction of air to produce oxygen and nitrogen for commercial use, flying machines, the moving picture and mercury-vapor lamps.

Advances have been made, of enormous importance, in chemical methods and materials, such as catalytic materials used in the manufacture of sulphuric acid and ammonia, and in the hydrogenation of organic substances; hydrogenization of oils whereby new products are obtained from cotton-seed oil; the discovery of cellulose esters; almost innumerable coal-tar products useful in pharmacy, dyeing, and photography; gas manufacture, such as acetylene gas; evaporation and drying of milk; gasoline manufacture; fixation of atmospheric nitrogen with resultant production of synthetic ammonia and nitric acid; rapid vulcanizing; glass making; manufacture of synthetic resins; recovery of potash from silicates for the manufacture of fertilizers.

By way of illustration, I will cite certain facts relating to bread making reported to me by the Mellon Institute. For a period of some five years an industrial fellowship has been maintained there, in which trained scientists have devoted their time to the study of methods of bread making, with the object of producing better bread. Certain of the processes developed have been patented and put into operation on a large scale and it is found that they not only produce better bread, but effect great economies. Better nourishment of the yeast has reduced the amount required in raising the bread and maturing the dough, with consequent lessening of the amount of flour and sugar which is used up by the yeast and converted into carbon dioxide and alcohol. The saving of these and other economies to those employing the novel processes are estimated to amount to over $1,000,000 per annum. This estimate is based upon the present high scale of prices, but on any scale of prices would be enormous.

The economy is illustrated in another way, as follows: The average flour production for the State of Kansas is about 20,000,000 barrels, or roughly, 4,000,000,000 pounds. The saving of flour effected is about 2 per cent., which would amount to 80,000,000 pounds, or 400,000 barrels annually on the production of this one State.

In the field of electrical engineering there has come the electric heater, the electric elevator, the supplanting of cable street railways by electric street railways, the electrification of long steam railway lines, train control, storage-battery developments, polyphase and high voltage systems of electric transmission, electro-dynamic phase transformers, long-distance transmission in telephones, and the development of the automatic switchboard.

I personally know of two patents, in the electrical field, both about to expire, each of which shortly after it was granted was sold for a large sum. Neither has been the subject of litigation, yet neither could at any time since the purchase have been bought for many times the sum paid for it.

In the field of farming implements there have come the tractor engines, apparatus for digging irrigation and drainage canals, beet harvesters, corn and cotton planters, deep-soil disk plows, cleaning and manipulation of cotton and wool fiber and other great advances.

But what is true of these arts is true of innumerable others, such as spinning, weaving, manufacture of steel, reinforced concrete for bridges and the like, the steel frame building, stone-working machinery, coal-mining machinery, and oil-drilling machinery.

The automobile has been almost wholly developed since 1890, and there have been vast advances in the construction of internal combustion engines; water purification methods and filters; fire extinguishers; match making, basket and barrel making machines; electrical welding; calcium carbide making; sound reproducing machines; flotation processes of concentrating ores; flour making and refining; shoemaking machinery.

In fact, the list might be extended almost indefinitely; and the prospect is that as great, or greater, advances and discoveries will be made in the immediate future.

Prior to 1836 the system both in this country and abroad was to grant patents on application therefor without any search to determine whether the alleged invention was really new. The system of granting patents on examination, which was established in 1836, was primarily in order to safeguard the public interest by the avoidance of unwarrantable grants.

It is obvious that the more thorough the examination and the more accurate the determination of the scope of a given invention, the more valuable the patent is to the patentee and the less likelihood there is of the improper grant of a patent or the grant of one with claims which are too broad. It is also obvious that in order that such an examination may be made it is necessary that the examining corps be composed of men qualified for such work both by education and experience and that they shall have time not only to examine applications but to study and keep abreast of what is being done in their several arts.

It takes time for an examiner to learn his art and how to handle it efficiently. An excessive loss of trained men is very uneconomical as new men can not for a long time efficiently do the work of those whom they replace.

The salaries paid at the present time to the members of the examining corps are not such as to hold the men or to attract properly trained men to stand the entrance examinations. During the year 1919 there were seventy-seven resignations from the examining corps of slightly over four hundred, and during the first ten months of 1920 there were seventy-eight resignations. The Civil Service Commission has not been able for a long time to furnish sufficient eligibles to fill these vacancies and many of the Fourth Assistant Examiners positions have been filled by making appointments of persons who had not passed the required test.

The greatest need of the Patent Office at the present time is, therefore, such a reorganization of the salaries as will attract graduates of the technical schools and justify them in making this work their life work. In other words, to change the Patent Office from what it largely is at the present time, a mere training school, to an institution offering a real career to its employees.

A bill (H. R. 11,984) for this purpose was passed by the House of Representatives last year and is now in conference, having been passed by the Senate in a somewhat different form. If this bill becomes a law it is believed that the desired results will largely be obtained.

If the examining corps could be stabilized not only would examinations for ascertaining the novelty of inventions be better made but the work could be kept much more nearly up to date. At the present time, due to the overturn in the examining corps and to a very large increase in the number of applications being filed, the work is far in arrears. In many instances this delay works a hardship on inventors and their assignees.

Another need of the Patent Office is the completion of the work of reclassification of existing patents. This work was begun some twenty years ago, but from time to time has been slowed down owing to the inability of the force to keep up with the examining work and also carry on reclassification work. At the present time it is not being pushed as vigorously as it should be for the same reason. With the increased force provided for by the pending bill above referred to this work can be proceeded with more rapidly. When all the patents have been classified the question can then be taken up of the desirability of publishing briefs of the inventions and abridgments such as published by the British Patent Office.

The Patent Office needs now more room and that need is becoming greater each year Not only are some of the examining divisions overcrowded and many of the clerks working under undesirable conditions, but there is not room available for the needed expansion of the public search room, the Scientific Library, and the storage of the rapidly accumulating records. This relief will have to come either by the erection of a new building or by allowing the Patent Office to occupy a portion of the building across F Street, which is connected to the Patent Office by a tunnel. Plans had been worked out for transferring certain divisions of the Patent Office to this building but at the outbreak of the war it was found necessary to assign this space to the War Department and the plans could not be carried out.

The work of the Patent Office has increased immensely in the last two years. While statistics are not usually very interesting it may be well to point out how great the increase in the work has been.

During the year ending June 30, 1919, there were filed 62,755 applications for patents for inventions, while in the year ending June 30, 1920, there were filed 81,948. The total number of applications, including applications for the registration of trade-marks, prints and labels, filed in the former year was 75,657 and in the latter 102,940. The increase in the applications for patent was 30% and in the applications for the registration of trade-marks 72%.